

# APPENDIX. FUNCTIONAL REQUIREMENTS LISTING AND PRIORITIES FOR NASA PORTALS FOR INTERNAL AND EXTERNAL AUDIENCES

## I. Functional Requirements

### A. Server Side Requirements

#### 1. Server Platform

- a. Unix server running Sun Solaris
- b. Unix server running Linux
- c. Intel-based server running Microsoft Windows NT Server, version 4.0

#### 2. Protocol Requirements

- a. Transport Control Protocol / Internet Protocol (TCP/IP)
- b. Hypertext Transfer Protocol (http), version 1.1
- c. Secure-Hypertext Transfer Protocol (https)
- d. Network News Transport Protocol (NNTP)
- e. Web-based Distributed Authoring and Versioning (WebDAV)
- f. Lightweight Directory Access Protocol (LDAP)

#### 3. Content Source

- a. HTML, version 4.01 and below
- b. XML
- c. XHTML

Inside		External	
Phase 1	Phase 2	Phase 1	Phase 2
M	M	M	M
O	O	O	O
O	O	O	O
M	M	M	M
M	M	M	M
M	M	M	M
M	M	M	M
P	P	P	P
M	M	M	M
M	M	M	M
M	M	M	M
M	M	M	M

**M** = Mandatory; **P** = Preferred; **O** = Optional; **blank** = No Opinion; **N/A** = Not applicable

- d. Plain Text (.txt)
- e. Application Formats
  - 1. MS Office 97 (Win), Office 2000 (Win), Office 98 (MAC)
  - 2. Word (.doc)
  - 3. Excel (.xls, .xlb)
  - 4. PowerPoint (.ppt)
  - 5. Portable Document Format (.pdf)
  - 6. Postscript Format (.ps)
  - 7. STEP-Compliant CAD files
- 4. Syndication Content Formats**
  - a. Information Content and Exchange (ICE), World Wide Web Consortium (W3C) Note 26 October 199
- 5. Databases**
  - a. Java Data Base Connectivity (JDBC)
  - b. Open Data Base Connectivity (ODBC)
- 6. Portal System Integration and Methods**
  - a. Tools for integrating with existing NASA and external data sufficient for each defined user group's list of critical COTS, GOTS, and custom applications.
  - b. Open standards API
    - 1. XML
    - 2. C++
    - 3. Java
    - 4. Perl
    - 5. JDBC

M	M	M	M
M	M	M	M
M	M	M	M
M	M	M	M
M	M	M	M
M	M	M	M
P	P	P	P
P	P	P	P
P	M	P	M
O	M	M	M
O	M	M	M
M	M	M	M
M	M	M	M
M	M	M	M
M	M	M	M
M	M	M	M
M	M	M	M

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6. ODBC		M	M	M	M
c. Software Development Kit		M	M	M	M
d. Channel oriented content publishing tools		M	M	M	M
e. Metadata		M	M	M	M
f. Data preparation tools					
1. Web accessible		M	M	M	M
2. Transparent enough for a non-technical user to learn quickly		P	M	P	M
g. Application Support					
1. Organic work group and community support	Policy/directory driven configurable applications which are built in to the portal				
a. Threaded discussions		O	P	O	P
b. Forums		O	P	O	P
c. Bulletin boards		O	P	O	P
d. Calendars		O	P	O	P
e. List serve		O	P	O	P
f. News		O	P	O	P
g. File archives		O	P	O	P
h. Email		O	O	O	O
2. Organic IFM application support		O	O	P	M
3. Bundled, public domain, or commercial application interfaces		O	P	P	M
4. Web application (HTML, JAVA, JAVA Script, XML) support via browser		M	M	M	M
5. Custom Applications	The system shall provide a mechanism to allow administrators to develop custom web-based applications that run within a data channel window	M	M	M	M

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## B. Security Requirements

- a. Meets NASA NPG 2810 security requirements
- b. Meets center perimeter and local CCB requirements
  - 1. HQ
  - 2. JPL
  - 3. Johnson
  - 4. Kennedy
  - 5. Langley
  - 6. Goddard
  - 7. Marshall
  - 8. Stennis
  - 9. Dryden
  - 10. Glenn

## C. Client (End-user) Requirements

### 1. Client User Access

- a. Configurable by userID, domain name, IP address, token id
- c. Internet Protocol Address Access Control      Client access shall be optionally configurable by the administrator based on Internet Protocol (IP) address
- d. Domain Name Access Control      Client access shall be optionally configurable by the administrator based on Domain Name
- e. Single Sign-On      The system shall be able to provide single sign-on capabilities to any userid/password/token id protected public NASA applications and services

M	M	M	M
M	M	P	P
P	M	M	M
P	M	P	M
P	M	P	M
P	M	P	M
P	M	P	M
P	M	P	M
P	M	P	M
P	M	P	M
		M	M
M	M		
M	M		
O	M	P	M

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f. Token ID	ACE server authentication option	P	M	M	M
<b>2. Client User Interface</b>					
a. Internet Explorer (IE) 4.0 or Netscape 4.0 or higher	The system client user interface must be accessible through the Netscape Communicator or the Microsoft Internet Explorer (IE) version 4.0 (or later) browser or equivalent on MAC and UNIX platforms	M	M	M	M
b. Plug-in requirements	The end-user client interface shall work without the use of non-bundled web browser plug-ins	P	M	P	M
c. Java/Java Script	The end-user client interface may require the use of Java and/or Java Script on the browser	O	O	O	O
d. Windows 95/98/ME Functionality	The end-user client interface shall provide browser based functionality for the Windows 95/98/ME desktop computing platforms	M	M	M	M
e. Windows NT/2000/XP Functionality	The end-user client interface shall provide browser based functionality for the Windows NT/2000/XP desktop computing platforms	P	M	M	M
f. Apple Macintosh Functionality	The end-user client interface shall provide browser based functionality for the Apple Macintosh desktop computing platform	M	M	M	M
g. UNIX Functionality	The end-user client interface shall provide browser-based functionality for the UNIX desktop computing platform	P	M	M	M
h. Palm OS Functionality	Strong protocol and application support	O	P	O	P

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i. Windows CE Functionality	Strong protocol and application support	O	P	O	P
<b>3. Client Functions</b>					
a. Multiple channels in single page	The system shall allow the display of multiple data channel windows within a single web page	M	M	M	M
b. Browseable directory of NASA web sites	The system shall provide a data channel window, tab, or equivalent user-interface element that accommodates a browseable directory of NASA web sites	M	M	M	M
c. User configurable start page	The system shall provide a personalized start page for each user that is customizable according to the preferences of each user and allows the opportunity to choose the content topics and interactive services to embed into the page	M	M	M	M
d. Log out state management	The system shall keep track of each user's state based on last log out time	M	M	M	M
e. Feedback method	The system shall provide a mechanism to provide feedback and comments	M	M	M	M
1. Link to user's email	The system notification method shall include but not be limited to notification to an external (outside the NASA portal) or internal e-mail account specified by the end-user	P	M		
2. Portal event notifications via email	The system shall allow end-users to receive notifications based on event triggers (a notification is sent when an event occurs, such as when a data channel receives a new object)	P	M		

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f. Search and directories	The system shall support the current headquarters public search	M	M		
1. Public search engine	The system shall integrate with the current HQ public search engine				
2. Alternate search engines	The system shall provide strong support for integrating secondary engine architectures to address specialized requirements	P	M		
3. Metadata support	Well integrated open standards based including but not limited to Dublin Core	M	M		
4. Directories					
a. Directory hierarchy	The browse directory shall display web sites in an administrator-configurable hierarchy provided by NASA				
b. Directory support	Multiformat, multilevel authored directories with flexible, metadata driven end user and group tools	P	M		
c. Category Tree/Taxonomy	The system shall provide the capability to create a category tree, or taxonomy, which allows end-users to search by category of information rather than by a keyword				
5. Required metadata fields	All content will be cataloged with metadata tags to support search, directory, and channel data assignment and retrieval				
a. Title Information Maintenance	The system shall maintain (although not necessarily simultaneously display) the title information (if available) for each NASA web site or other NASA	M	M		

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	data objects contained in the browse directory				
b. URL Information Maintenance	The system shall maintain (although not necessarily simultaneously display) the URL information (if available) for each NASA web site or other NASA data objects contained in the browse directory	M	M		
c. Description Information Maintenance	The system shall maintain (although not necessarily simultaneously display) the DESCRIPTION information (if available) for each NASA web site or other NASA data objects contained in the browse directory	M	M		
d. Keyword Information Maintenance	The system shall maintain (although not necessarily simultaneously display) the KEYWORD information (if available) for each NASA web site or other NASA data objects contained in the browse directory	M	M		
e. Categorization Information Maintenance	The system shall maintain (although not necessarily simultaneously display) the CATEGORY information (if available) for each NASA web site or other NASA data objects contained in the browse directory	M	M		
f. Access Restriction Information	The system shall maintain (although not necessarily simultaneously display) the ACCESS RESTRICTION information (if available) for each NASA web site or other NASA data objects contained in the browse directory	M	M		

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g. Updated Record Information	The system shall maintain (although not necessarily simultaneously display) the date that the last record was updated information (if available) for each NASA web site or other NASA data objects contained in a browse directory	M	M		
h. Layout	Wide range of user or administrator configurable attributes to include:				
1. Data channel layout	Channel layout shall be flexibly specified	M	M	M	M
2. Content channels within channel layout	User configurable attributes of the start page shall at least include the content within specific data channel windows	M	M	M	M
3. Character format	User configurable attributes of the start page shall at least include the font face, size and color	M	M	M	M
1. System-Level Change Notification	The system shall provide a mechanism for end-users to automatically receive notifications of system-level changes as specified by administrators				
2. Data Channel Change Notification	The system shall provide a mechanism for end-users to automatically receive notifications of changes within individual data channels				
3. Data Channel Sub-Elements Change Notification	The system shall provide a mechanism for end-users to automatically receive notifications of changes to sub-elements within individual data channels, such as changes to a document file				

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4. Notification Receipt Control	End-users shall be able to control which notifications, if any, to which they subscribe
5. Time Period Notification	The system shall allow end-users to receive notifications based on time period (a summary of changes is sent at a user specified time period)
k. Security and privilege roles	The system and all its data elements shall be configurable to support all NASA NPG 2810 and all other pertinent policies and policy guidance for the following rolls

## II. Administrative Requirements

### A. Configurable start pages linked to user roles

### B. Content refresh and management

1. Publishing Rights and Approval Processes	The system shall support distributed, hierarchical user/group/role assignment of publishing rights
2. Role-based Access	All content will be accessed through an integrated role-based privilege assignment system
3. New and Updated Content Retrieval	The system shall provide the capability to periodically gather fresh content, and assemble this content for users to view on the portal or via e-mail updates
4. Required vs. Optional Data Channels	The system shall accommodate both required data channels that the user cannot remove, and optional data channels that the users can choose to display or not

M	M	M	M
M	M	M	M
M	M	M	M
M	M	M	M
M	M	M	M

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**5. Filters**

The system shall support the use of filters that will use business rules to determine where content belongs in the portal, to automate the process of adding new content

M	M	M	M
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**6. Exclusive Content Control**

The system shall provide a mechanism for generating reports about logs such as traffic to the system based on both total hits and unique visitors

M	M	M	M
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**7. Online Content Sources**

The system shall allow the user easy access to information feeds including public domain, gratis commercial services, or commercial services

O	O	M	M
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**8. NASA-Subscribed Sources**

The system shall allow the user easy access to syndicated news feeds from NASA-subscribed content sources

O	O	M	M
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**9. Channel permission structure**

The system shall support a flexible, easily administered channel permission structure

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**C. Web-based portal management interface**

M	M	M	M
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**D. Flexible scheduling and assignment of labor intensive administrative tasks**

P	M	P	M
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**E. Channel permission structure**

M	M	M	M
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**F. Visual style configuration****1. Font Appearance**

The system shall allow an administrator to control the system-wide appearance of the Font style (e.g., bold, italics, underline, etc.); Font face, Font size, and Font color web page attributes

M	M	M	M
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**2. Header Content and Appearance**

The system shall allow an administrator to control the system-wide appearance of the header content web page attribute

M	M	M	M
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**3. Footer Content and Appearance**

The system shall allow an administrator to control the system-wide appearance of the footer content web page attribute

M	M	M	M
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**4. Configuration for New Users**

The system shall allow an administrator to configure default start pages for new users according to user type or any other administrator-defined group

M	M	M	M
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**G. Required vs. Optional Data Channels**

The system shall accommodate both required data channels that the user cannot remove, and optional data channels that the users can choose to display or not

**H. Frequently Accessed Content Storage**

The system shall provide a mechanism to store frequently accessed content and services in memory on the web server in order to maximize scalability and provide users with quick retrieval of the portal page

O	M	P	M
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**I. User Authentication**

The system should support all of NASA's user authentication systems

**1. Kerberos4**

		M	M
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**2. Kerberos5**

		M	M
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**3. NT domain**

M	M	M	M
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**4. Token ID**

M	M	M	M
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**5. X.509 Protocol**

The system should support Public Key Infrastructure (PKI) authentication as specified by the IETF in the X.509 protocol

M	M		
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## J. Users and Groups Administration

The system shall support distributed, hierarchical user/group/role administration. A granular security system be provided to allow administrators to assign different levels of administrative privileges to users throughout the portal, so a distributed community of NASA personnel may manage the portal

M	M	M	M
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## K. Reporting

### 1. Generating Log Reports

### 2. Usage Tracking

The system shall provide a mechanism for tracking usage of specific data channels

M	M	M	M
M	M	M	M

## L. On-Line Help

The system shall supply context-sensitive on-line help to the user

M	M	M	M
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## M. Web Material Archival

The system shall support a content archival process consistent with all relevant records management policy

M	M	M	M
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## N. Web Material Retention

The system shall support a content retention process consistent with all relevant records management policy

M	M	M	M
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## III. Performance Requirements

### A. Multiple User Account Support

The system shall support user account access (having a user name, password) for all public end-users of NASA's web portal.

#### 1. 10,000 users

#### 2. 50,000 users

#### 3. Unlimited users (growing server resources as required)

M	M	M	M
P	M	O	M
P	P	P	P

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## B. Concurrent User Support

1. 500 active users
2. 5,000 active users
3. 50,000 active users

Active users are defined as being currently logged on to the system and using a portal web client

M	M	M	M
P	M	O	M
P	P	P	P

## C. Concurrent Action Support

1. 100 active processes
2. 500 active processes
3. 5000 active processes

These are actions being performed on the server to support users (i.e., log-on, authentication, password change, dynamically generating HTML pages, download documents or process queries)

M	M	M	M
P	M	O	M
P	P	P	P

## D. Hours of Operation

1. NASA business day
2. 24/7/365 with routine outages
3. Non-stop 24/7/365 operation

The system shall be available and operational 24 hours per day, 7 days a week with a 9x% up-time matrix

8:00 a.m. EST until 9:00 p.m. EST

System always available except for routine and emergency outages with 9x% uptime metric

System always available except for emergency outages with 99.x% uptime metric

M	M	M	M
P	M	P	M

O	O	O	O
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## E. Scalability

The system shall be scalable to multiple servers to allow tuning system performance to accommodate additional users, increasing concurrent users or concurrent actions

M	M	M	M
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## F. Third-Party Load Balancing Systems

The system shall accommodate third-party hardware and software load balancing systems

M	M	M	M
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## G. System Performance Reports

The system shall provide system performance reporting capabilities

M	M	M	M
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H. Compatible with network monitoring tools TBD

## IV. Support Requirements

### A. Technical Support

#### 1. Technical Support

The vendor shall provide technical support to any NASA administrator or system staff personnel with a NASA domain e-mail address

#### 2. Technical Support Hours

The vendor shall provide telephone technical support Monday through Friday, 8:00 am through 6:00 pm Eastern Standard Time (EST)

#### 3. Technical Support Responses

The vendor shall respond within two working hours to a telephone technical support call. If the call is received after 2:45 pm EST, then the call may be returned as late as 8:45 am EST on the next NASA working day. It is the preference of NASA to have telephone technical support calls answered by a live voice in an expedient manner

#### 4. E-mail Requests for Technical Support

The vendor shall be capable of receiving e-mail requests for technical support

#### 5. Acknowledge of Receipt Via Return E-Mail

The vendor's technical support system shall promptly acknowledge the receipt of an e-mail request for technical support via return e-mail to the sender

#### 6. On-Site Support

The vendor shall be capable of providing on-site expert technical support

M	M	M	M
M	M	M	M
M	M	M	M
M	M	M	M
M	M	M	M
M	M	M	M
M	M	M	M

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<b>7. Fulfilling On-Site Support Request</b>	The vendor shall be capable of fulfilling a request for expert on-site technical support within three (3) NASA working days	M	M	M	M
<b>B. Technical Support Request Tracking System</b>	The vendor shall provide a web-accessible tracking program for all technical support requests	M	M	M	M
<b>C. System Shut Down</b>	The date and time of any required system shut down shall be configurable by authorized administrators at a specified date and time	M	M	M	M
<b>D. Context-Sensitive On-line Help</b>		M	M	M	M
<b>E. Online tutorial and other built-in training materials</b>		P	M	P	M
<b>V. Software Requirements</b>					
<b>A. Host Location</b>	The system software may be hosted at NASA, off-site or at a combination of both, pursuant to compliance with NASA information security requirements (NPG 2810.1)	M	M	M	M
<b>B. Modular Software Architecture</b>	The software shall be able to run unbundled from proprietary software in such a way that different components (I.e., search engine, content management systems) can be easily changed out to allow for other vendors' products to run in tandem with the portal software	M	M	M	M
<b>C. IP Logging</b>	The system software shall log all access attempts to the system by IP address	M	M	M	M

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## D. Security of information

### 1. Security of BRT information

Pursuant to NASA Procedures and Guidelines, "Security of Information Technology", NPG 2810, the consumer portal software will handle BRT Information

### 2. Security of SER Information

Pursuant to NASA Procedures and Guidelines, "Security of Information Technology", NPG 2810, the consumer portal software will handle Scientific, Engineering, and Research (SER) Information

### 3. Security of ADM Information

Pursuant to NASA Procedures and Guidelines, "Security of Information Technology", NPG 2810, the consumer portal software will handle Administrative (ADM) Information

### 4. Security of PUB Information

Pursuant to NASA Procedures and Guidelines, "Security of Information Technology", NPG 2810, the consumer portal software will handle Public Access (PUB) Information

## VI. Interface Requirements

### A. Open Protocol Support

The vendor shall provide a list of open protocols that are supported and a statement as to what degree they are supported

### B. EudoraPro Support

The system shall be capable of launching the NASA EudoraPro or other popular e-mail software within the consumer portal

O	O	O	P
O	P	M	M
O	P	M	M
M	M	M	M
M	M	M	M
P	M	M	M

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## VII. Training Requirements

### A. Web Portal Training for NASA Personnel

The vendor shall provide appropriate training to in the design, implementation, administration and maintenance of the portal server and accompanying application to NASA technical personnel and its contractors

### B. Web Portal Training for Information Publishers

The vendor shall provide appropriate training to information publishers creating data streams for display in portal data channels

## VIII. Test Requirements

### A. Internal Acceptance Testing

The vendor shall perform internal acceptance testing on the software prior to each delivery

### B. User Interface Testing

The vendor shall perform user interface testing on the software prior to each delivery

### C. Performance Testing

The vendor shall perform performance testing on the software prior to each delivery

### D. Load Level Testing

The vendor shall perform load testing prior to each delivery. The load levels tested shall reflect the load levels listed in section III. Performance

### E. Load Level Testing Duration

The period for each load level tested shall be a continuous 24 hours

M	M	M	M
M	M	M	M
M	M	M	M
M	M	M	M
M	M	M	M
M	M	M	M
M	M	M	M

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